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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,271	09/12/2003	David Decker	DKT01021B	7771
7590 07/27/2007 BorgWarner, Inc. Patent Administrator 3850 Hamlin Road Auburn Hills, MI 48326-2872				
			EXAMINER VERDIER, CHRISTOPHER M	
			ART UNIT 3745	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/661,271

Applicant(s)

DECKER ET AL.

Examiner

Christopher Verdier

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 9-12-03, 10-16-03.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application
- ☐ Other: ____.

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Priority

Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 09/875,760, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application.

Claims 9 and 18, which recite that the compressor wheel is titanium, aluminum, and vanadium, have no support in the prior-filed application for the third component being vanadium.

Claim 19, which recites that the titanium alloy comprises 85-95% titanium, 2-8% aluminum, and 2-6% vanadium, has no support in the prior-filed application for these percentages.

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Claim 20, which recites that the titanium alloy comprises approximately 90% titanium, 6% aluminum, and 4% vanadium, has no support in the prior-filed application for these percentages.

This application repeats a substantial portion of prior Application No. 09/875,760, filed June 6, 2001, and adds and claims additional disclosure not presented in the prior application. Since this application names an inventor or inventors named in the prior application, it may constitute a continuation-in-part of the prior application. Should applicant desire to obtain the benefit of the filing date of the prior application, attention is directed to 35 U.S.C. 120 and 37 CFR 1.78.

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

The claims are clearly different from the original claims of prior Application No. 09/875,760 and thus are a form of a preliminary amendment, although applicant has not characterized the claims as being part of a preliminary amendment. Also, paragraph 0037 of the specification similarly is different from column 6, lines 44-47 of U.S. Patent 6,663,347 (which is prior Application No. 09/875,760) and thus is a form of a preliminary amendment. Applicant is required to submit a supplemental oath or declaration under 37 CFR 1.67 referring to both the

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application and the preliminary amendment filed with the application. A surcharge under 37 CFR 1.16(f) is also required unless it has been previously paid. MPEP 608.04(b).

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "17". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The specification is objected to because it is replete with clerical and grammatical errors too numerous to mention in all instances. The following are several examples of defects. The specification should be carefully proofread for additional defects. Appropriate correction is required.

The first paragraph of the specification should indicate that 09/875,760 is now U.S. Patent 6,663,347.

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In paragraph 17, line 9, -- that -- should be inserted after "assembling".

In paragraph 18, line 4, "wchich" should be changed to -- which --.

In paragraph 22, line 5, "processes" should be changed to -- process --.

In paragraph 28, line 5, "teach" should be changed to -- each --.

Paragraph 37 of the specification filed on September 12, 2003 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The titanium alloy consisting of 90% titanium, 6% aluminum, and 4% vanadium, has no support in the prior-filed application 09/875,760 for these percentages and is new matter.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9 and 18-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the

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claimed invention. Claims 9 and 18, which recite that the compressor wheel is titanium, aluminum, and vanadium, has no support in the prior-filed application 09/875,760 for the third component being vanadium. Claim 19, which recites that the titanium alloy comprises 85-95% titanium, 2-8% aluminum, and 2-6% vanadium, has no support in the prior-filed application for these percentages. Claim 20, which recites that the titanium alloy comprises approximately 90% titanium, 6% aluminum, and 4% vanadium, has no support in the prior-filed application for these percentages.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 19-20 characterize the invention as a method and depend on claim 18, however, claim 18 claims a turbocharger and not a method. Thus it is unclear if claims 19-20 are meant to be method claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 6-8, 10-12, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joco 4,705,463 in view of Norton 6,164,931 and Japanese Patent 62-117,717. Joco (figures 1-4 and 6) discloses an air boost device substantially as claimed, comprising a compressor housing 44/72 having an air inlet 55/unnumbered and an air outlet 56/unnumbered, and a centrifugal compressor wheel 12 mounted for rotation within the compressor housing, the compressor wheel including a hub 14 defining an axis of rotation, and a plurality of backswept aerodynamic blades 16 carried on the surface of the hub and defining air passages between adjacent blades. The compressor wheel is a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially. The compressor housing includes a volute-shaped chamber 56/unnumbered adapted for receiving air discharged from the compressor wheel. The compressor wheel aerodynamic blades comprise alternating full blades 16 and splitter blades (unnumbered). Also disclosed is a turbocharger comprising a turbine housing 68 including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel

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62 rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel.

However, Joco does not disclose that the compressor wheel is a titanium centrifugal compressor wheel (claims 1 and 10), does not disclose that each of the air passages is definable by from one to three solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades (claims 1 and 10), does not disclose that the number of die inserts is one (claims 6 and 15), and does not disclose that the compressor wheel is a titanium alloy (claims 7 and 16).

Norton (figures 2-3) shows a compressor wheel 96 that may be formed of a titanium alloy, for the purpose of providing durability and heat resistance.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the compressor wheel of Joco from titanium alloy, as taught by Norton, for the purpose of providing durability and heat resistance.

Japanese Patent 62-117,717 (figures 1-5) shows a centrifugal wheel having a plurality of backswept aerodynamic blades 100c carried on a surface of a hub 100a and defining air passages between adjacent blades, with each of the air passages being definable by one solid die insert 4 which can be inserted between and pulled from between the blades without deformation of the dies or blades, for the purpose of providing a manner of molding a complicated blades shape.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of Joco such that each of the air passages is defined by one solid die insert which can be inserted between and pulled from between the blades without deformation of the dies or blades, as taught by Japanese Patent 62-117,717, for the purpose of providing a manner of molding a complicated blades shape.

Claims 4-5 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joco 4,705,463 and Norton 6,164,931 and Japanese Patent 62-117,717 as applied to claims 1 and 10 above, and further in view of Hyll 4,706,928. The modified air boost device/turbocharger of Joco shows all of the claimed subject matter, except for each of the air passages being defined by three solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades (claims 4 and 13), and except for each of the air passages being defined by two solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades (claims 5 and 14).

Hyll (figures 5-13) shows an impeller 15 having unnumbered air passages being defined by three solid die inserts which can be inserted between and pulled from between unnumbered blades without deformation of the dies or blades, for the purpose of providing a manner of molding a complicated blade shape.

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It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of Joco such that each of the air passages is defined by three solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades, as taught by Hyll, for the purpose of providing a manner of molding a complicated blade shape. The recitation in claims 5 and 14 of each of the air passages being defined by two solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades is a matter of choice in design. Hyll teaches that impeller 15 has its air passages being defined by three solid die inserts which can be inserted between and pulled from between unnumbered blades without deformation of the dies or blades. It would have been further obvious to a person having ordinary skill in the art to select the number of solid die inserts to be two, since one of ordinary skill in the art would have recognized from the teachings of Hyll that the impeller air passages are formed by plural solid die inserts, and selecting the number of die inserts necessary to define the air passages to be a specific number of a plurality, such as two, would be a matter of choice in design to define the geometry of the air passages.

Claims 9 and 18-20 (as far as claims 19-20 are definite and understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over Joco 4,705,463 and Norton 6,164,931 and Japanese Patent 62-117,717 as applied to claims 1 and 10 above, and further in view of Yamamoto 6,127,044. The modified air boost device/turbocharger of Joco shows all of the claimed subject matter, except for the compressor wheel being comprised of titanium, aluminum, and vanadium (claims 9 and 18), except for the titanium alloy comprising 85-95% titanium, 2-

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8% aluminum, and 2-6% vanadium (claim 19), and except for the titanium alloy comprising approximately 90% titanium, 6% aluminum, and 4% vanadium.

Yamamoto shows a turbine wheel 3 with blades 1, with the wheel and blade being formed from 90% titanium, 6% aluminum, and 4% vanadium alloy (column 3, lines 13-20), for the purpose of preventing erosion and providing superior reliability.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of Joco such that the compressor wheel is comprised of 90% titanium, 6% aluminum, and 4% vanadium alloy, as taught by Yamamoto, for the purpose of preventing erosion and providing superior reliability. Although Yamamoto is directed to turbine rotors, one of ordinary skill in the art would have recognized the applicability of the teachings of Yamamoto to compressor rotors, since compressor rotors are analogous to turbine rotors and are subject to similar types of erosion.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 15, and 17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 1, 1, 2, 3, 4, 1, 1, 1, 1, 2, 3, 4, and 1, respectively, of U.S. Patent No. 6,663,347 in view of Joco 4,705,463. The above claims of the instant application claim substantially the same subject matter as the above claims of U.S. Patent No. 6,663,347, but do not claim a compressor housing having an air inlet and an air outlet, with the centrifugal compressor wheel mounted for rotation within the compressor housing (claim 1), do not claim that the compressor wheel is a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially (claim 2), do not claim that the compressor housing includes a volute-shaped chamber adapted for receiving air discharged from the compressor wheel (claim 3), do not claim a turbocharger comprising a turbine housing including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel, and a compressor housing having an air inlet and an air outlet (claim 10), do not claim that the compressor wheel is a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially (claim 11), and do not claim that the compressor

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housing includes a volute-shaped chamber adapted for receiving air discharged from the compressor wheel (claim 12).

Joco (figures 1-4 and 6) shows an air boost device comprising a compressor housing 44/72 having an air inlet 55/unnumbered and an air outlet 56/unnumbered, and a centrifugal compressor wheel 12 mounted for rotation within the compressor housing, the compressor wheel including a hub 14 defining an axis of rotation. The compressor wheel is a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially. The compressor housing includes a volute-shaped chamber 56/unnumbered adapted for receiving air discharged from the compressor wheel. Also disclosed is a turbocharger comprising a turbine housing 68 including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel 62 rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel. The arrangement is provided for the purpose of extracting power from the turbocharger.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the compressor wheel of the above claims of U.S. Patent No. 6,663,347 such that it includes a compressor housing having an air inlet and an air outlet, with the centrifugal compressor wheel mounted for rotation within the compressor housing, with the compressor wheel being a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially, with the compressor housing including a volute-shaped chamber adapted for receiving air discharged from the compressor

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wheel, and with a turbocharger comprising a turbine housing including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel, as taught by Joco.

Claims 7 and 16 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,663,347 and Joco 4,705,463 as applied to claims 1 and 10 above, and further in view of Norton 6,164,931. The modified compressor wheel of claim 1 of U.S. Patent No. 6,663,347 shows all of the claimed subject matter except for the compressor wheel being titanium alloy (claims 7 and 16).

Norton shows a compressor wheel 96 that may be formed of a titanium alloy, for the purpose of providing durability and heat resistance.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of claim 1 of U.S. Patent No. 6,663,347 from titanium alloy, as taught by Norton.

Claims 9 and 18-20 (as far as claims 19-20 are definite and understood) are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,663,347 and Joco 4,705,463 as applied to claims 1 and 10 above, and further in view of Yamamoto 6,127,044. The modified compressor wheel of claim 1 of U.S. Patent No. 6,663,347 shows all of the claimed subject matter except for the compressor wheel

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being comprised of titanium, aluminum, and vanadium (claims 9 and 18), except for the titanium alloy comprising 85-95% titanium, 2-8% aluminum, and 2-6% vanadium (claim 19), and except for the titanium alloy comprising approximately 90% titanium, 6% aluminum, and 4% vanadium.

Yamamoto shows a turbine wheel 3 with blades 1, with the wheel and blade being formed from 90% titanium, 6% aluminum, and 4% vanadium alloy (column 3, lines 13-20), for the purpose of preventing erosion and providing superior reliability.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of claim 1 of U.S. Patent No. 6,663,347 such that the compressor wheel is comprised of 90% titanium, 6% aluminum, and 4% vanadium alloy, as taught by Yamamoto. Although Yamamoto is directed to turbine rotors, one of ordinary skill in the art would have recognized the applicability of the teachings of Yamamoto to compressor rotors, since compressor rotors are analogous to turbine rotors and are subject to similar types of erosion.

Claims 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 15, and 17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 3, 8, 7, 6, 9, 1, 2, 3, 8, 7, 6, and 9, respectively, of U.S. Patent No. 6,904,949 in view of Joco 4,705,463 and Japanese Patent 62-117,717. The above claims of the instant application claim substantially the same subject matter as the above claims of U.S. Patent No. 6,904,949, but do not claim a

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compressor housing having an air inlet and an air outlet, with the centrifugal compressor wheel mounted for rotation within the compressor housing, with the blades defining air passages between adjacent blades and with the die inserts that can be inserted between and pulled from between the blades without deforming the blades or the dies (claim 1), and do not claim a turbocharger comprising a turbine housing including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel, and a compressor housing having an air inlet and an air outlet with the blades defining air passages between adjacent blades and with the die inserts that can be inserted between and pulled from between the blades without deforming the blades or the dies (claim 10).

Joco (figures 1-4 and 6) shows an air boost device comprising a compressor housing 44/72 having an air inlet 55/unnumbered and an air outlet 56/unnumbered, and a centrifugal compressor wheel 12 mounted for rotation within the compressor housing, the compressor wheel including a hub 14 defining an axis of rotation. Blades 16 of the compressor wheel define air passages between adjacent blades. Also disclosed is a turbocharger comprising a turbine housing 68 including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel 62 rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel. The arrangement is provided for the purpose of extracting power from the turbocharger.

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It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the compressor wheel of the above claims of U.S. Patent No. 6,904,949 such that it includes a compressor housing having an air inlet and an air outlet, with the centrifugal compressor wheel mounted for rotation within the compressor housing, with the blades defining air passages between adjacent blades, and as a turbocharger comprising a turbine housing including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel, as taught by Joco.

Japanese Patent 62-117,717 (figures 1-5) shows a centrifugal wheel having a plurality of backswept aerodynamic blades 100c carried on a surface of a hub 100a and defining air passages between adjacent blades, with each of the air passages being definable by solid die inserts 4 which can be inserted between and pulled from between the blades without deformation of the dies or blades, for the purpose of providing a manner of molding a complicated blades shape.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of the above claims of U.S. Patent No. 6,904,949 such that each of the air passages is defined by solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades, as taught by Japanese Patent 62-117,717.

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Claims 7 and 16 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,904,949 and Joco 4,705,463 and Japanese Patent 62-117,717 as applied to claims 1 and 10 above, and further in view of Norton 6,164,931. The modified compressor wheel of claim 1 of U.S. Patent No. 6,904,949 shows all of the claimed subject matter except for the compressor wheel being titanium alloy (claims 7 and 16).

Norton shows a compressor wheel 96 that may be formed of a titanium alloy, for the purpose of providing durability and heat resistance.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of claim 1 of U.S. Patent No. 6,904,949 from titanium alloy, as taught by Norton.

Claims 9 and 18-20 (as far as claims 19-20 are definite and understood) are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,904,949 and Joco 4,705,463 and Japanese Patent 62-117,717 as applied to claims 1 and 10 above, and further in view of Yamamoto 6,127,044. The modified compressor wheel of claim 1 of U.S. Patent No. 6,904,949 shows all of the claimed subject matter except for the compressor wheel being comprised of titanium, aluminum, and vanadium (claims 9 and 18), except for the titanium alloy comprising 85-95% titanium, 2-8% aluminum, and 2-6% vanadium

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(claim 19), and except for the titanium alloy comprising approximately 90% titanium, 6% aluminum, and 4% vanadium.

Yamamoto shows a turbine wheel 3 with blades 1, with the wheel and blade being formed from 90% titanium, 6% aluminum, and 4% vanadium alloy (column 3, lines 13-20), for the purpose of preventing erosion and providing superior reliability.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of claim 1 of U.S. Patent No. 6,904,949 such that the compressor wheel is comprised of 90% titanium, 6% aluminum, and 4% vanadium alloy, as taught by Yamamoto. Although Yamamoto is directed to turbine rotors, one of ordinary skill in the art would have recognized the applicability of the teachings of Yamamoto to compressor rotors, since compressor rotors are analogous to turbine rotors and are subject to similar types of erosion.

Claims 1, 2, 3, 6, 7, 8, 10, 11, 12, 15, 16, and 17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 1, 1, 1, 6, 5, 1, 1, 1, 1, 6, and 5, respectively, of U.S. Patent No. 6,629,556 in view of Joco 4,705,463 and Japanese Patent 62-117,717. The above claims of the instant application claim substantially the same subject matter as the above claims of U.S. Patent No. 6,629,556, but do not claim a compressor housing having an air inlet and an air outlet, with the centrifugal compressor wheel mounted for rotation within the compressor housing, with the blades defining air passages

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between adjacent blades and with the die inserts that can be inserted between and pulled from between the blades without deforming the blades or the dies (claim 1), do not claim that the compressor wheel is a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially (claim 2), do not claim that the compressor housing includes a volute-shaped chamber adapted for receiving air discharged from the compressor wheel (claim 3), do not claim a turbocharger comprising a turbine housing including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel, and a compressor housing having an air inlet and an air outlet, with the blades defining air passages between adjacent blades and with the die inserts that can be inserted between and pulled from between the blades without deforming the blades or the dies (claim 10), do not claim that the compressor wheel is a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially (claim 11), and do not claim that the compressor housing includes a volute-shaped chamber adapted for receiving air discharged from the compressor wheel (claim 12).

Joco (figures 1-4 and 6) shows an air boost device comprising a compressor housing 44/72 having an air inlet 55/unnumbered and an air outlet 56/unnumbered, and a centrifugal compressor wheel 12 mounted for rotation within the compressor housing, the compressor wheel including a hub 14 defining an axis of rotation. Blades 16 of the compressor wheel define air passages between adjacent blades. The compressor wheel is a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially.

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The compressor housing includes a volute-shaped chamber 56/unnumbered adapted for receiving air discharged from the compressor wheel. Also disclosed is a turbocharger comprising a turbine housing 68 including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel 62 rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel. The arrangement is provided for the purpose of extracting power from the turbocharger.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the compressor wheel of the above claims of U.S. Patent No. 6,629,556 such that it includes a compressor housing having an air inlet and an air outlet, with the centrifugal compressor wheel mounted for rotation within the compressor housing, with the blades defining air passages between adjacent blades, with the compressor wheel being a centrifugal compressor wheel adapted for drawing air in axially, accelerating the air centrifugally, and discharging air radially, with the compressor housing including a volute-shaped chamber adapted for receiving air discharged from the compressor wheel, and with a turbocharger comprising a turbine housing including an exhaust gas inlet and an exhaust gas outlet, and a turbine wheel rotationally mounted within the turbine housing, with the centrifugal compressor wheel rotationally driven by the turbine wheel, as taught by Joco.

Japanese Patent 62-117,717 (figures 1-5) shows a centrifugal wheel having a plurality of backswept aerodynamic blades 100c carried on a surface of a hub 100a and defining air passages between adjacent blades, with each of the air passages being definable by solid die inserts 4

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which can be inserted between and pulled from between the blades without deformation of the dies or blades, for the purpose of providing a manner of molding a complicated blades shape.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of the above claims of U.S. Patent No. 6,629,556 such that each of the air passages is defined by solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades, as taught by Japanese Patent 62-117,717.

Claims 4-5 and 13-14 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable all over claim 1 of U.S. Patent No. 6,629,556 and Joco 4,705,463 and Japanese Patent 62-117,717 as applied to claim 1 above, and further in view of Hyll 4,706,928. Modified claim 1 of U.S. Patent No. 6,629,556 shows all of the claimed subject matter except for each of the air passages being defined by three solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades (claims 4 and 13), and except for each of the air passages being defined by two solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades (claims 5 and 14).

Hyll (figures 5-13) shows an impeller 15 having unnumbered air passages being defined by three solid die inserts which can be inserted between and pulled from between unnumbered

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blades without deformation of the dies or blades, for the purpose of providing a manner of molding a complicated blade shape.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of claim 1 of U.S. Patent No. 6,629,556 such that each of the air passages is defined by three solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades, as taught by Hyll, for the purpose of providing a manner of molding a complicated blade shape. The recitation in claims 5 and 14 of each of the air passages being defined by two solid die inserts which can be inserted between and pulled from between the blades without deformation of the dies or blades is a matter of choice in design. Hyll teaches that impeller 15 has its air passages being defined by three solid die inserts which can be inserted between and pulled from between unnumbered blades without deformation of the dies or blades. It would have been further obvious to a person having ordinary skill in the art to select the number of solid die inserts to be two, since one of ordinary skill in the art would have recognized from the teachings of Hyll that the impeller air passages are formed by plural solid die inserts, and selecting the number of die inserts necessary to define the air passages to be a specific number of a plurality, such as two, would be a matter of choice in design to define the geometry of the air passages.

Claims 9 and 18-20 (as far as claims 19-20 are definite and understood) are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,629,556 and Joco 4,705,463 and Japanese Patent 62-117,717 as applied to

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claims 1 and 10 above, and further in view of Yamamoto 6,127,044. The modified compressor wheel of claim 1 of U.S. Patent No. 6,629,556 shows all of the claimed subject matter except for the compressor wheel being comprised of titanium, aluminum, and vanadium (claims 9 and 18), except for the titanium alloy comprising 85-95% titanium, 2-8% aluminum, and 2-6% vanadium (claim 19), and except for the titanium alloy comprising approximately 90% titanium, 6% aluminum, and 4% vanadium.

Yamamoto shows a turbine wheel 3 with blades 1, with the wheel and blade being formed from 90% titanium, 6% aluminum, and 4% vanadium alloy (column 3, lines 13-20), for the purpose of preventing erosion and providing superior reliability.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor wheel of claim 1 of U.S. Patent No. 6,629,556 such that the compressor wheel is comprised of 90% titanium, 6% aluminum, and 4% vanadium alloy, as taught by Yamamoto. Although Yamamoto is directed to turbine rotors, one of ordinary skill in the art would have recognized the applicability of the teachings of Yamamoto to compressor rotors, since compressor rotors are analogous to turbine rotors and are subject to similar types of erosion.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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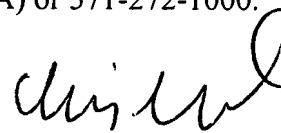
Smith is cited to show an integrally bladed rotor made of Ti-6Al-4V.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C.V.
July 13, 2007


Christopher Verdier
Primary Examiner
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